



NGST Scientist's Expert Assistant (SEA)

**Design Review
February 2, 1998**



Agenda

- Review recent activities, status, and goals
- Summarize system requirements
- Conceptual design for science objects
- User interface layout and design
- Sample class interactions




Recent Activities and Goals

- FY '98 Phase II Goal: prototype “proof-of-concept” tools (using ACS as primary test bed source)
- Implemented prototype Exposure Calculator
- Developed core system design
- Finalized decision on rule-based development environment
- Current team:
 - at GSFC: Jeremy Jones, Tom Brooks, Lisa Dallas, San Grosvenor, LaMont Ruley
 - at STScI: Anuradha Koratkar, ACS Science Team, and h of others providing input and feedback



Current Status

- **Exposure Calculator:**
 - Prototype development completed December as scheduled.
 - Initial development base for the primary science objects
 - Needs to be updated to reflect revised design and implement remaining features
 - Gather and incorporate usability feedback
- **Fundamental object design complete**
 - Allow quick development of browser styles
- **Advisor/J training upcoming**
 - Will get Sandy and Tom up-to-speed in both Advisor's rules development and its interfaces with Java
 - Speed completion of interview design



Objectives: March / SPIE Conference

2 abstracts approved for SPIE as poster sessions

Proposal Browser and Interview:

- Framework implemented, not all editors fully implemented

Target Selector:

- Preliminary search and data extraction from NED, fed into Target T

Visual Target Tuner:

- Able to display FITS image, manipulate target by dragging and rota

Instrument Configuration ES:

- Able to interact with rule base and user using small rule set covering ACS filter selection at a minimum

Exposure Calculator:

- Current functionality, cleaned up and fully tested, help implemented Precise instrument for model TBD (STIS? ACS? NGST?)



Objectives: End of FY '98

- **Proposal Browser and Interview:**
 - Full suite of preliminary editors
- **Target Selector:**
 - Increase database selection / extraction capabilities
- **Visual Target Tuner:**
 - Display image from several sources, display symbolic image, select areas for inclusion/exclusion, initial simulation of simulated image bleeding, spikes, etc
- **Instrument Configuration ES:**
 - Increase rule-base to cover full ACS configuration and documentation links
- **Exposure Calculator:**
 - Add ability to simulate image
- **Perform usability testing, obtain astronomer feedback, incorporate results**



Software Technologies and Tools

- Tool suite emphasizes newest technologies
- Java language, latest releases
- Development Environment:
 - Symantec Visual Café for Java
- Java Libraries:
 - Sun's Java Foundation Classes (code-named Swing)
 - Visualize Tech's DataVista graphics package
- Source Code Control:
 - Microsoft Visual Source Safe
- Rules Development Environment:
 - Neuron Data's Advisor/J



Requirements Review

- Construct Phase II proposals for ACS, later NGS
- Simple process for new users
 - User inputs desired science
 - System translates to proposal parameters
- Full capability for experienced users
 - User can manipulate entire proposal
 - Access to all proposal parameters
- Easily accessible over World Wide Web
- Platform-independent
- Centralized external data management (help and other data files, stored once)



Requirements Review

- **Proposal**
 - Load, save, print, submit proposals
 - Multiple proposals open at once
 - Copy items between proposals
- **User Interface**
 - Interview style for less-experienced users
 - Browser style for experienced users
 - Switch styles at any time
 - Multiple areas of same proposal open at once
 - Changes automatically propagated to all areas
 - Help easily accessible: both interface and scientific reference

High Level Conceptual Overview

Browser Style User Interface

"forms-based" approach for more experienced users or for editing a proposal after exposures have been defined.

Interview Style User Interface

for infrequent or new users, goal-driven, rules based approach. Emphasizes science-oriented questions and expert system generated recommendations

data mods from interface to data model

model tells interface of changes from other sources, or rejects interface change if not valid

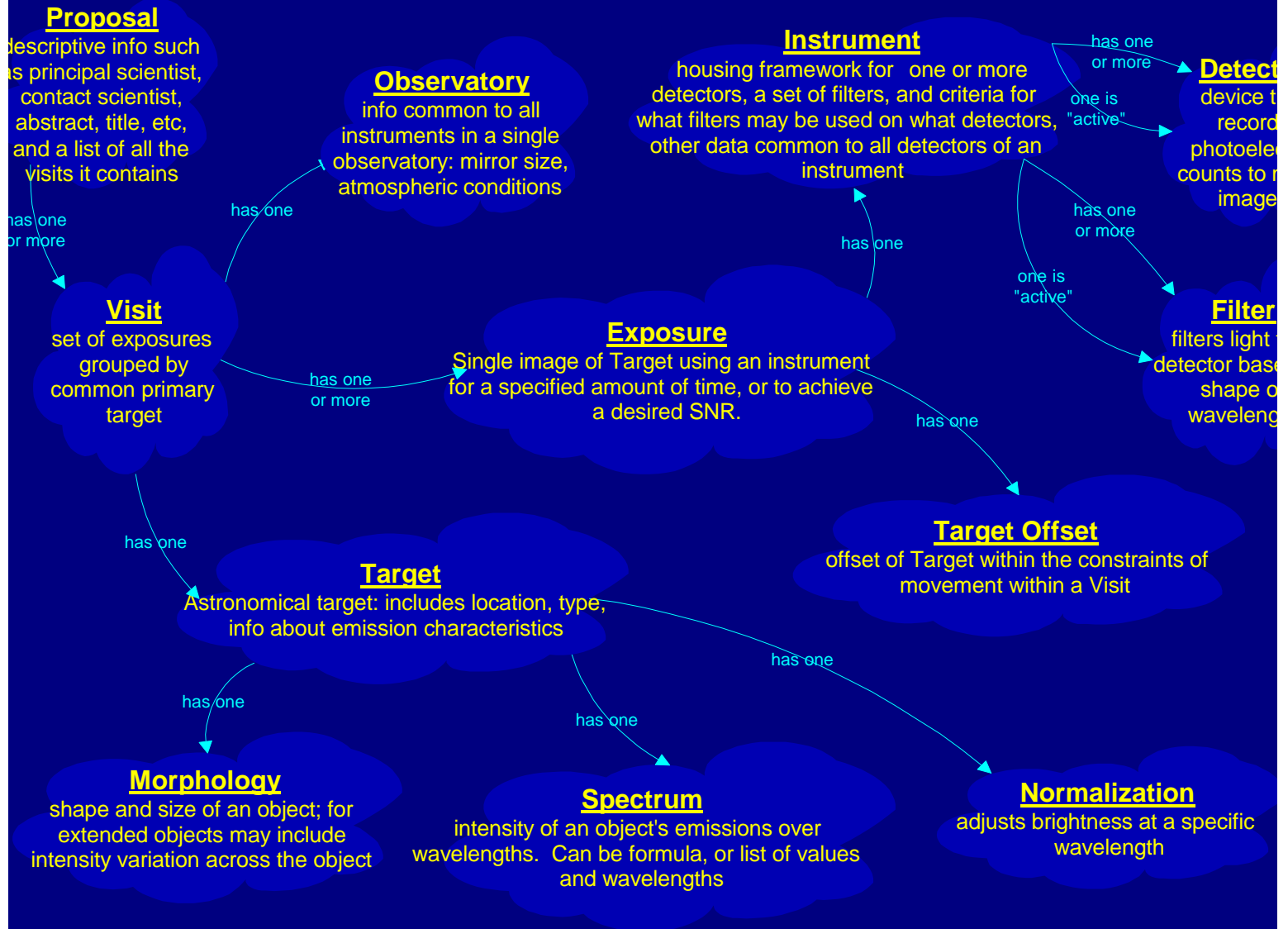
data mods from interface to data model

model tells interface of changes from other sources, or rejects interface change if not valid

Science Object Data Model

contains the proposal data and knowledge. Central manager of change notification. Knows nothing about user interfaces. But does know how to send/read itself to disk or network


Science Objects Conceptual Breakdown





User Interface - General Features

- **Drag and Drop**
 - Supported throughout the design
 - Drag items between areas in one or more proposals
 - Uses Java Foundation Classes (JFC) Drag and Drop API
- **Help**
 - Global Help Menu: *User's guides, reference documentation*
 - ToolTips: *Short description for each user interface element*
 - Context-sensitive Help: *HTML documentation for each user interface element or the concept it represents*
- **Change Propagation**
 - Change in one editing window automatically passed on other windows and underlying data model



User Interface - Interview Style

- **Target Audience**
 - New or infrequent users
- **Basic Paradigms**
 - Goal-based navigation
 - Continuous availability
- **Presentation**
 - Goal tree
 - Graphical Q & A panel
 - Transcript viewer

Interview Conceptual Diagram

List Frame:

Dynamic List of "Goals" or steps needed/ completed

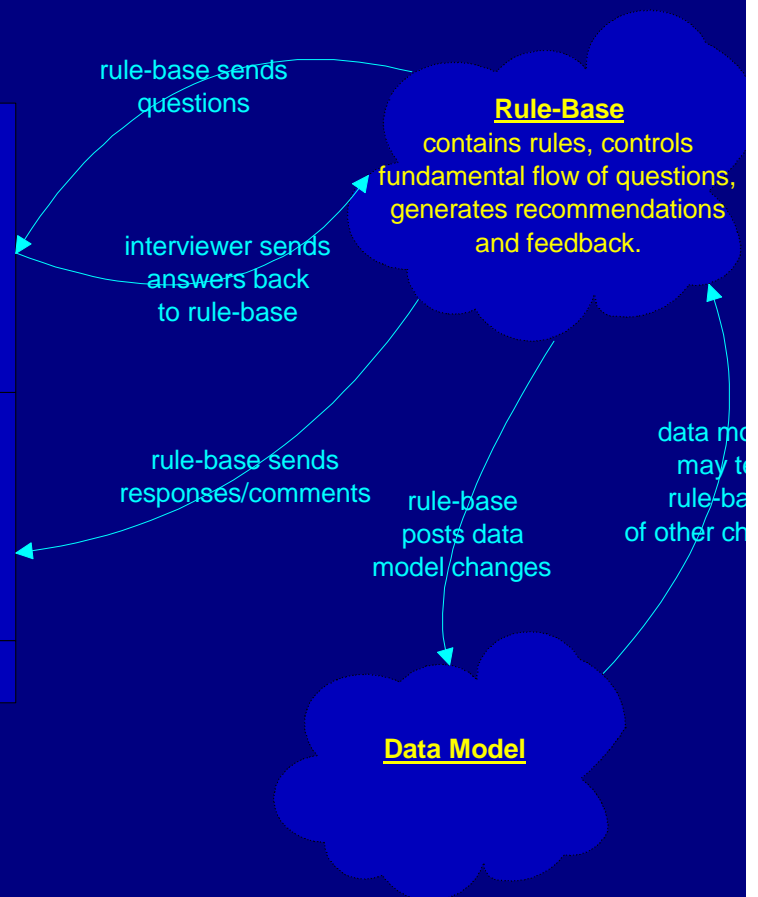
Question Frame:

requests for information from rule-base with fields for user response

Response Frame:

rule-base generated comments, and feedback from most recent Q&A

Navigation Bar: buttons to move around:



Interview Style: Example 1

Applet Viewer: ProtoInterview.class

Applet

Goals History Browser

- Enter Summary Information
- Visit 1
 - Enter Observatory Parameters
 - Select Primary Target
 - Exposure 1-1
 - Set Target Offset
 - Configure Instrument**
 - Set Exposure Time
 - Create New Exposure
 - Create New Visit

THE HUBBLE SPACE TELESCOPE'S
Advanced Camera
FOR SURVEYS

Interview Question

What basic type of observation do you want to make?

☐ Spectroscopy ☐ Coronagraphy ☐ Polarimetry ☒ Imaging

What central wavelength or wavelength range are you interested in?

520-530 nm

Comments

Imaging is supported on all three of ACS' cameras. Your wavelength is supported on four of the filters that can be used by two of ACS' detectors, [WFC](#) and [HRC](#).

< Back Next > Finish Cancel Help

Question box asks information fed by rule base

Comments contains feedback from rule base

Goal list tracks what information user has entered and how far along they are

Navigation buttons let rule base guide user through proposal

Including links to additional information

Interview Style: Example 2

Goals History Browser

- Enter Summary Information
- Visit 1
 - Enter Observatory Parameters
 - Select Primary Target
 - Exposure 1-1
 - Set Target Offset
 - Configure Instrument**
 - Set Exposure Time
 - Create New Exposure
 - Create New Visit

THE HUBBLE SPACE TELESCOPE'S
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Interview Question

The following detector / filter combinations meet your criteria:

- WFC, narrow V filter
- WFC, Johnson V filter
- WFC, Broad V Filter
- HRC, narrow V filter
- HRC, Johnson V filter
- HRC, Broad V Filter

Comments

The [Wide Field Camera](#) has a larger resolution and can see deeper for the same exposure than the [High Resolution Camera](#). The [narrow band V filter](#) best spans the wavelength you specified

< Back Next > Finish Cancel Help

Based on previous screen new question asked by user base

For above comments vary as different items are previewed



User Interface - Proposal Browser

- Full capability of editing proposal
- Includes view of entire proposal
- Select item in proposal view to open module
- Quickly switch between editors within same window
- Open multiple editors in separate windows

Browser Interface Conceptual Diagram

Tree View Frame:

Hierarchical view of proposal components

Module Viewer/Editor Frame:

contains editor for currently selected item in the proposal. The editing tool will vary depending on the type of item

Interface Component

adds interface related knowledge to science object. Communicates with Browser Interface.

Data Model

Module can be any of the following depending on the type of component selected in the tree view:

Proposal
Summary
Editor

Target
Selector

Visual
Target Tuner

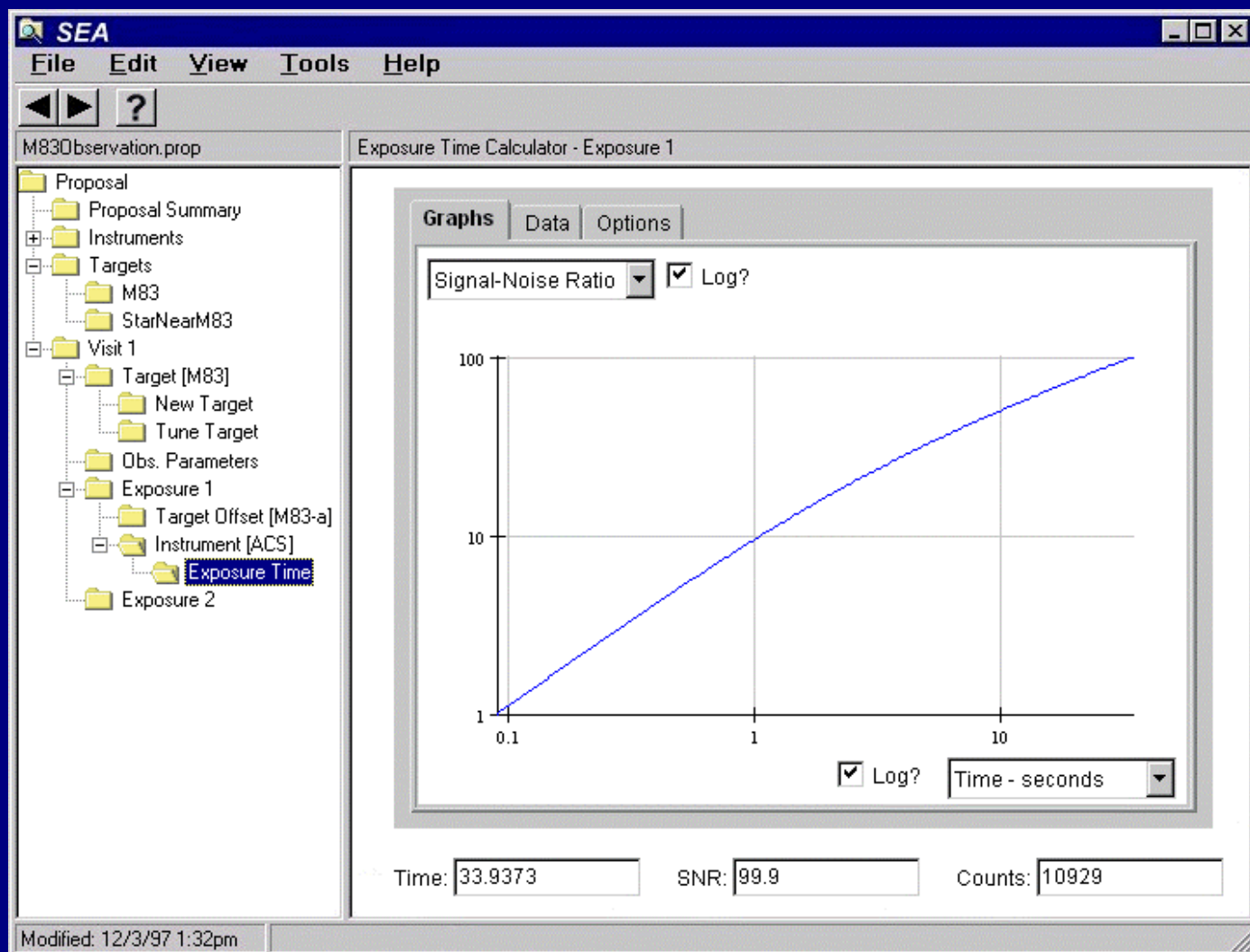
Visit
Planner

Component /
Folder Viewer

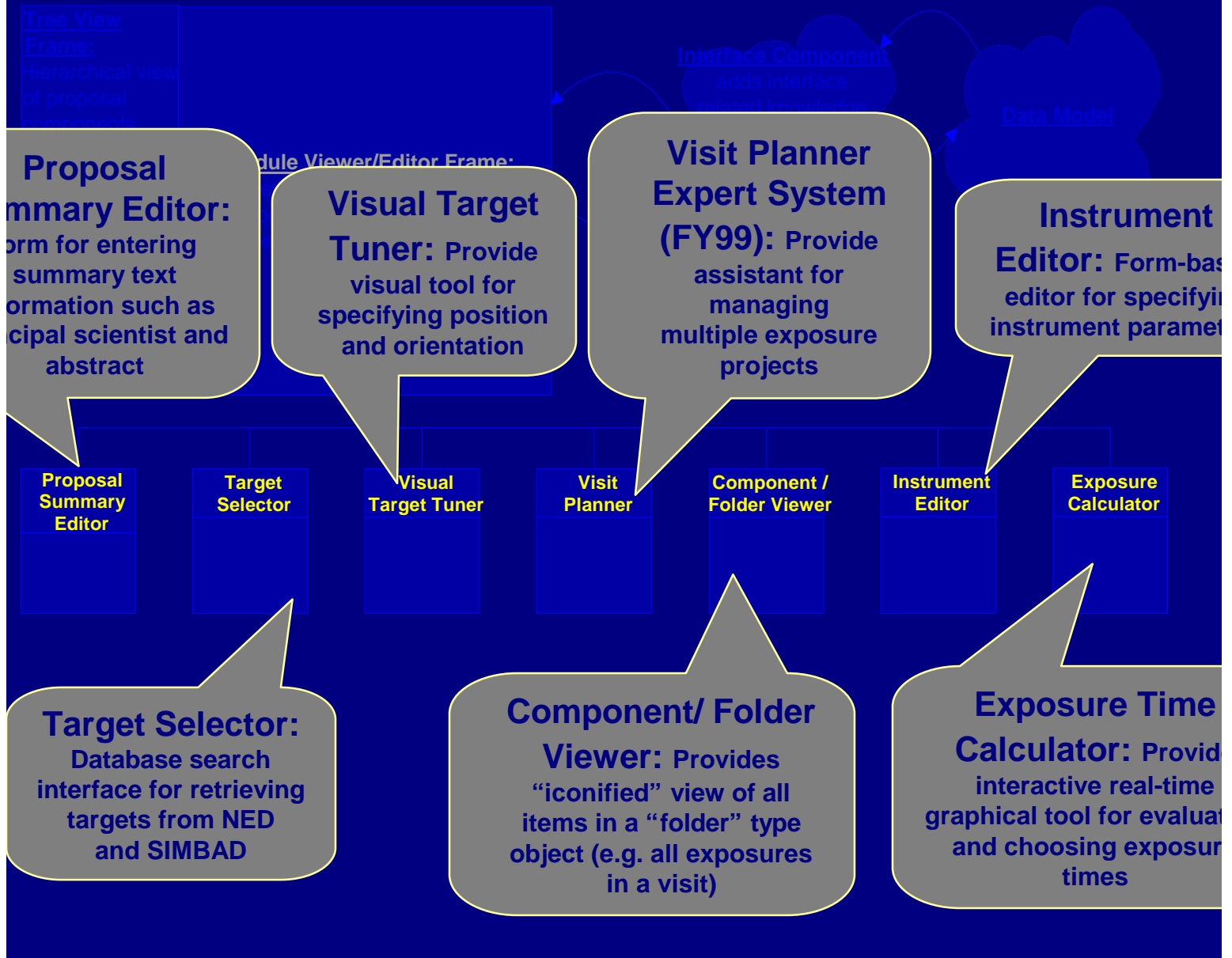
Instrument
Editor

Exposure
Calculator

Proposal Browser Example

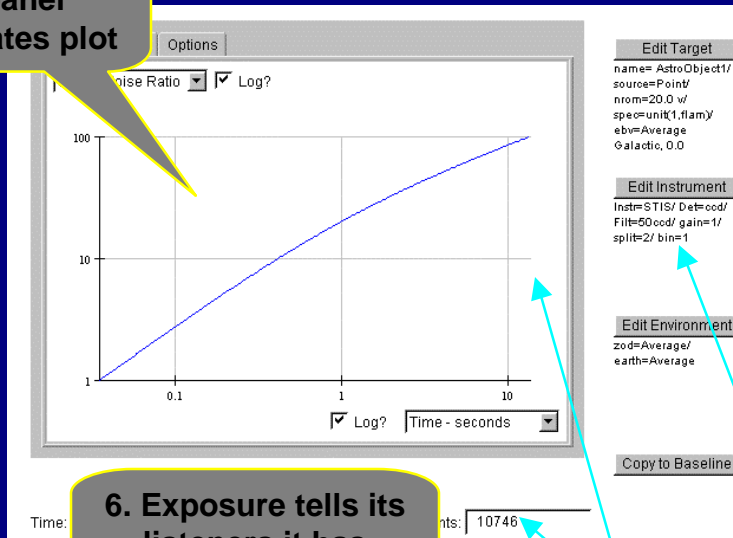


User Interface - Modules



Change Notification Example - Exposure Calculator

7. Graph panel updates plot



6. Exposure tells its listeners it has changed

ExposureSynPhot

5. Host returns new counts

Host Synphot Server

4. Exposure initiates host call to get new counts

3. Instrument tells its listeners that it has changed

Instrument

2. Dialog changes instrument filter

1. ch
f



Final Comments

- Completed initial design for underlying science object overall interface, and browser interface
- Tested implementation through exposure calculator
- Next:
 - Complete rule-based / interview design, implement prototype filter handler for ACS
 - Prepare papers and software demonstration for SPIE in May
 - Complete promised functionality by end of FY
- Status information and latest prototypes are at:
 - <http://aaadev.gsfc.nasa.gov/NGSTProtos>
- Comments and feedback welcome and encouraged:
 - Jeremy.Jones@gsfc.nasa.gov
 - Sandy.Grosvenor@gsfc.nasa.gov